

IN THE CLAIMS

1-24 (Cancelled)

25. (New) An apparatus, comprising:

control circuitry; and

a memory coupled to the control circuitry comprising instructions executable by the control circuitry, the control circuitry operable when executing the instructions to:

receive a call setup signaling message sent by a remote originating node to initiate routing of a virtual circuit connection;

inspect a predefined portion of received call setup signaling message for information formatted as one or more ATM generic transport information elements, and when such information is observed, analyze the observed ATM generic transportation information elements for a link utilization value;

determine whether a utilization of a local link contained within a peer group of the apparatus corresponds to the link utilization value; and

control whether the local link is included the virtual circuit connection according to said determination.

26. (New) The apparatus of claim 25 wherein the control circuitry is further operable to:

identify a ratio of actual utilization of the link to the link utilization value;

generate link utilization information by, at least in part, multiplying the ratio by a cost indicator associated with the local link; and

determine whether the local link is included in the virtual circuit connection according to the generated link information.

27. (New) The apparatus of claim 25 wherein the local link is located within a peer group of the apparatus and located outside a different peer group of the originating node, and wherein the apparatus controls inclusion of the local link autonomously in response to receiving the call setup signaling message.

28. (New) A method comprising:

generating a signaling message to initiate routing of a virtual circuit connection through a remote peer group;

generating an information element having a predefined format, the information element representing a link utilization value;

formatting the generated signaling message to contain the information element, the presence of the information element in the predefined format to trigger a router located in the remote peer group to select a link for including in the virtual circuit connection according to the link utilization value.

29. (New) The method of claim 28 wherein the signaling message is sent using the Private Network to Network Interface (PNNI) protocol and the predefined format is a Generic Application Transport Information Element (GATIE) format.

30. (New) The method of claim 29 further comprising sending a soft rerouting message after the virtual circuit connection is established, the soft rerouting message including the same or different link utilization value formatted using the GATIE format.

31. (New) The method of claim 30 wherein the soft rerouting message elicits formation of a new path prior to tear down of an existing path for the virtual circuit connection.

32. (New) The method of claim 31 wherein the new path retains terminating nodes of the virtual circuit connection but excludes at least one midpoint node belonging to the existing path.

33. (New) An apparatus, comprising:
control circuitry; and
a memory coupled to the control circuitry comprising instructions executable by the control circuitry, the control circuitry operable when executing the instructions to:
identify whether a target link is a local link contained within a peer group of the apparatus, and when the target link is local, inquire within the peer group for utilization information of the link and directly control inclusion of the target link in a virtual circuit connection according to the utilization information;

identify whether the target link is a remote link contained outside the peer group of the apparatus, and when the target link is remote, generate a call setup signaling message to initiate routing of the virtual circuit connection;

insert a link utilization limit into a predefined location within the call setup signaling message, the presence of the link utilization limit in the predefined location to trigger a remote node located outside the peer group to control inclusion of the remote target link in the virtual circuit connection according to the link utilization limit.

34. (New) The apparatus of claim 33 wherein the control circuitry is further operable to format the link utilization limit as an ATM Generic Application Transport Information Element (GATIE) included in the call setup signaling message, the formatting of the link utilization limit as an ATM GATIE to cause remote devices inspecting ATM GTIEs to observe the link utilization limit and control link inclusion responsive to the observation.

35. (New) The apparatus of claim 34 wherein the formatting of the link utilization limit as an ATM GTIE provides undisrupted forwarding of the call setup signaling message through remote devices that do not support controlling link inclusion according to the link utilization limit.

36. (New) The apparatus of claim 35 wherein the call setup signaling message is transferred over a trunk link that couples the peer group of the apparatus to the remote peer group.

37. (New) The apparatus of claim 36 wherein the call setup signaling message allows the apparatus to remotely control inclusion of links outside the peer group of the apparatus independently of whether the apparatus is provided with messages indicating the utilization of the outside links.

38. (New) A method, comprising:
receiving a call setup signaling message sent by a remote originating node to initiate routing of a virtual circuit connection;

observing an ATM generic application transport information element included in the call setup signaling message, and responsive to observing the ATM generic application transport information element, analyzing the observed ATM generic application transport information element for a link utilization value;

determining whether a utilization of a local link contained within a peer group of the apparatus corresponds to the link utilization value; and

controlling whether the local link is included in the virtual circuit connection according to said determination.

39. (New) The method of claim 38 wherein the utilization of the local link corresponds to an amount of capacity that has been reserved on the local link.

40. (New) The method of claim 38 wherein the utilization of the local link corresponds to an amount of capacity that is actually being used on the local link.

41. (New) The method of claim 38 further comprising:
identifying a ratio of actual utilization of the link to the link utilization value;
generating link utilization information by, at least in part, multiplying the ratio by a cost indication associated with the local link; and

determining whether the local link is included in the virtual circuit connection according to the generated link information.

42. (New) A system comprising:
means for generating a call setup signaling message to establish a virtual circuit connection extending from an originating node;

means for formatting the call setup signaling message with an opaque information element, the opaque information element representing a link utilization value;

means for sending the call setup signaling message having the opaque information element along a path through a network;

wherein the opaque information element is sent through both first routers that are configured to inspect for the opaque information elements and through second routers that are non-configured for said inspection;

wherein the opaque information element triggers the first routers to select between links for the virtual circuit connection according to a comparison of the link utilization value to utilization of the links;

wherein the opaque information element is forwarded unmodified by the second routers that are non-configured for said inspection.

43. (New) The system of claim 42 wherein the opaque information element is an ATM generic application transport information element.

44. (New) The system of claim 42 wherein the call setup signaling message is a Private Network to Network Interface (PNNI) protocol setup message.

45. (New) The system of claim 42 further comprising means for selecting between the links based on both the comparison and costs associated with the links.

46. (New) The system of claim 42 wherein the utilization of the links corresponds to an amount of capacity that has been reserved.

47. (New) The system of claim 42 wherein the utilization of the links corresponds to an amount of capacity that is actually being used.